back is compensated by the temperature stability attained, which allows precise electrical measurements to be taken, even at temperatures higher than 4·2° K.

In conclusion, it should be mentioned that, starting from room temperature, the specimen can be cooled down to liquid helium temperature in 25 min, with a liquid helium consumption of about 2 l. However, for the α-uranium and zinc irradiation subsequently carried out by these authors a much lower cooling rate of 2 deg/min was used. The total cooling time was then ~3 h.

The authors wish to express their gratitude to Professeur Y. Cauchois for her encouragement. One of us (P.L.) would like to thank Mr. J. C. Jousset both for helpful discussions and for the part he took in the calibration work.

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# A LOW TEMPERATURE APPARATUS FOR STUDYING E.P.R.

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*Received 15 August 1965*†

AN apparatus has been built to study e.p.r. at a wavelength $\lambda = 8$ mm in crystals at low temperatures and the details are shown in Figure 1. The specimen 1 is stuck to the stand 2 and is in the millimetre range resonator 3. Resonator 3 (internal diameter 13 mm) is soldered at two places to the thin walled 16 mm diameter stainless steel tube 4. Resonator 3 is tuned by moving the german silver waveguides 5 (internal dimensions 5·2 × 2·6 mm², wall thickness 0·2 mm) in a vertical plane, together with piston 6 and coupling diaphragms 7. By means of the screw connection 8 to the flange 9 soldered to the waveguide, the piston can be mounted with coupling diaphragms of different diameters. Resonator 3, stand 2, piston 6, and the coupling diaphragms are made of silver-plated brass. The arrangement for moving the waveguide consists of a micrometer screw 11 fastened to a fixed pillar 10, the nut 12, lock-nut 13, ball 14, sleeve 15, pin 16, cylinder 17, and bellow 18. The mode of operation is clear from the Figure.

Temperatures below 1·3° K are obtained in the present apparatus as described by Esel'son et al.[1]

† Received by PTÉ Editor 27 July 1964: *Pribory i Tekhnika Éksperimenta* No. 2, p. 202 (1965)

When the temperature of the outer bath 19 is 1·3° K (produced by pumping on liquid helium-4 with a rotary pump) gaseous helium-3 from cylinder 20 is condensed in tube 4 and fills the metal Dewar 22 (inner diameter 20 mm, height 250 mm) and resonator 3 through the 2 mm diameter orifice 8. In addition to orifice 21 for filling the resonator, there are several (not shown in the Figure) holes in flange 9 and two 0·5 mm wide slits cut along the centre of opposite sides of the waveguides between flange 9 and piston 6. The helium-3 reaches the resonator from the waveguides through the coupling diaphragm. After the condensation is finished the 7 mm diameter bellows valve 23 is opened and the charcoal adsorption pump 24 is brought into operation (a copper cylinder, 72 mm diameter, 240 mm high, containing 100 g BAU charcoal) lowering the vapour pressure over the liquid helium-3 and, consequently, its temperature. The temperature is determined from the helium-3 vapour pressure, measured on a short U-tube manometer and two McLeod gauges.

The minimum temperature of 0·314° K is obtained 10 min after the start of pumping and when ~3·5 l. of gaseous helium-3 ($p = 760$ torr, $T = 293°$ K) is condensed, stays constant for not less than 3·5 h.